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Irrigation Management of Peas

Peas are grown as a vegetable crop for both fresh and dried seed. Peas belongs to the legume family, which also includes a number of other cultivated crops, such as alfalfa, clover, and soybeans.

Pea varieties range from tall climbing to small bunch types with the latter having a shorter growing period. Peas are a cool climate crop, the optimum mean daily temperature is 17°C with a minimum of 10°C and a maximum of 23°C. Young plants can tolerate a light frost, but flowers and green pods are injured. Hot weather, especially at the time of flowering, is harmful and causes blasting of the flowers.

The pea plant has a poor tolerance to soil salinity at all stages of growth. Crop yield decreases dramatically at increased levels of soil salinity.

Crop water requirements and crop yield

Well-drained clay loam soils are best for peas. Light sandy soils with low moisture holding capacities tend to give lower yields. Greater care in irrigation management must be taken if pea crops are grown on sandy soils. Good drainage is essential to minimize diseases such as root rot.

Pea crops develop an active rooting zone of approximately 80 cm (2.5 ft) in nonrestrictive soils during the growing season. The seeding date for peas is generally between April 25 and May 10. The growth period extends from May 10 to August 15 with 70 to 80 days needed for fresh peas to reach proper maturity and 95 to 100 days for seed peas.

Peas will use up to 375 mm (fresh) (15 in.) and 400 mm (seed) (16 in.) of moisture over the growing season, with a 30 day average maximum water use of 6.0 mm/day (0.24 in./day). During the early stage of crop development peas will use from 1.0-2.0 mm/day (0.04 to 0.08 in./day) and will rise to 6.0 mm/day (0.24 in./day) during the flowering stages. (See figure 1)

Full root extension is achieved during the blossom stage when full ground cover occurs. The moisture-sensitive period for peas is from the flowering to yield formation (pod development and pod filling) periods. Unlimited water application during the vegetative (pre-blossom) period increases vegetative growth but may not affect the pea yield. A water deficit during this period and similarly during the ripening period (for dry peas) has a small effect on yield.

When there is insufficient rainfall, irrigation during the flowering period increases the number of marketable pods and number of seeds per pod. Irrigation during the yield formation period increases weight of both pod and seed. The pea crop removes 70 per cent of its water requirements from the top half of the root zone (40 cm).

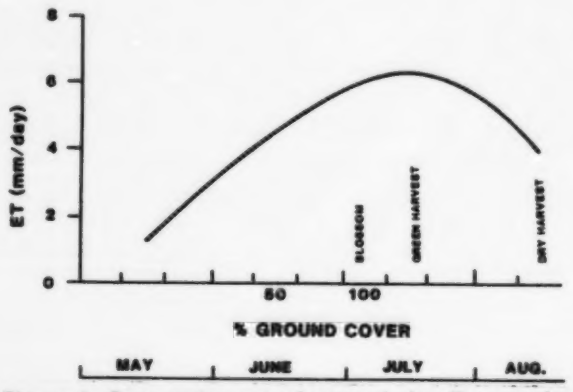

Figure 1. Crop water use of peas during the growing season.

For higher yields, the allowable soil moisture depletion should not exceed 60 per cent of the total available soil water during the vegetative period, and 40 per cent during the flowering and yield formation periods. Although it is important to maintain adequate soil moisture, uneven ripening results from too frequent and light irrigation applications.

Irregular irrigations cause pods and seeds to be less uniform in size, more variable in color, and the date of maturity will vary.

Yields of dry peas as high as 4500 kg/ha (4000 lb/ac) at 12 per cent moisture content, have been realized in southern Alberta. A producer should have consistent yields of 2800 kg/ha (2500 lb/ac), using proper management. (See figure 2)

Comments

Peas are a cool season crop. As the plants have a restricted root system, they cannot tolerate hot weather or drought stress during flowering, because the flowers

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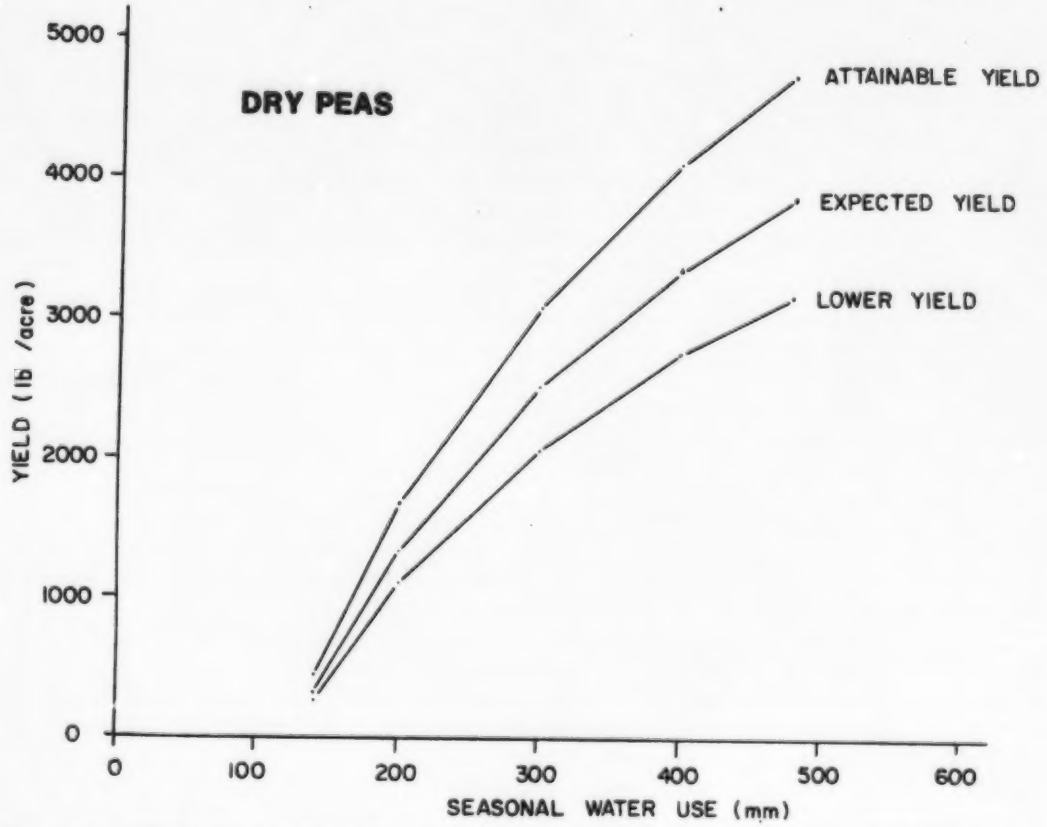

Figure 2. Graph showing the relationship between the yield of dry peas and seasonal water use.

are easily blasted, resulting in loss of seed set.

To reduce the risk of disease, do not grow peas on the same land for at least four years. Do not grow broadleaf crops such as beans, lentils, faba beans, canola or sunflowers after peas because of their susceptibility to similar diseases.

Irrigation management information

For further information regarding irrigation of peas contact your nearest irrigation branch office. Location of these offices is Lethbridge, 381-5136; Vauxhall, 654-2161; Airdrie, 948-8511; Taber, 223-7908; Strathmore, 934-3356; Brooks, 362-1212; Bow Island, 545-2231; Medicine Hat, 529-3616. North of Calgary, contact the Airdrie office or your local district agriculturist for assistance.

Growth and development of peas

GROWTH PERIOD	VEGETATIVE	FLOWERING	POD DEVELOPMENT AND FILLING	RIPENING
POST EMERGENCE DATES	FRESH 35-40 DAYS	FRESH 50-60 DAYS	FRESH 65-70 DAYS	FRESH 75-85 DAYS
	DRIED 40-45 DAYS	DRIED 55-65 DAYS	DRIED 75-90 DAYS	DRIED 95-100 DAYS
CROP * ROOT DEPTH	1.5cm/DAY		MINIMAL ROOT EXTENSION	
MOISTURE SENSITIVE PERIOD**				
AVERAGE E.T.	1.5 - 4.5mm/DAY	4.5 - 6.0mm/DAY	6.0 - 6.5mm/DAY	< 6.5mm/DAY

* Maximum rooting depth will occur approximately the time flowering has been completed.

** For optimum production, the first irrigation will be required before the crop enters its water sensitive period.

The above times, depth and amounts are only averages for this particular crop. These values will change depending on the variety and area where this crop is grown.

Soil

Soils can vary greatly in texture from being very fine (clay) to very coarse (sand) within a crop root zone. Because soil texture can change quite quickly, so can the amount of water that the soil is able to hold.

Texture	Available Moisture
Loamy sand	8-12 mm/0.1m (0.9-1.4 in./ft)
Sand loam	10-15 mm/0.1m (1.2-1.8 in./ft)
Loam	14-18 mm/0.1m (1.7-2.1 in./ft)
Sand clay loam, clay loam, clay	15-20 mm/0.1m (1.8-2.4 in./ft)
Silty clay loam, silt loam	16-22 mm/0.1m (1.9-2.6 in./ft)

It is important to know and to be able to calculate the amount of moisture present in the soil root zone in order to understand the amount of moisture available for crop use. Allowable depletion level is the amount of soil mositure that can safely be removed from the root zone by a crop before an irrigation is required. For peas, the allowable depletion level has been determined to be 40 per cent. The simplest way to determine soil moisture content is by the "feel" method. By feeling, squeezing and observing a handful of soil. The following chart outlines the various characteristics of soil based on differing water content.

		Feel or Appearance of Soils		
	PERCENT OF AVAILABLE MOISTURE REMAINING	MODERATELY COARSE TEXTURE	MEDIUM TEXTURE	MODERATELY FINE TEXTURE
DO NOT IRRIGATE	At field capacity 100	Upon squeezing no free water appears on soil but wet outline of ball is on left hand.	Same as sandy loam.	Same as sandy loam.
	75 to field capacity	Forms a weak ball, breaks easily, will not slide.	Forms a ball and is very pliable; slicks readily if relatively high in clay.	Easily ribbons out between fingers,has a slick feeling.
IRRIGATE SPEC. CROPS	50 to 75	Tends to ball under pressure but seldom will hold together	Forms a ball; somewhat plastic; will sometimes slick slightly with pressure.	Forms a ball, will ribbon out between thumb and forefinger.
IRRIGATE	25 to 50	Still appears to be dry, wil not form ball with pressure.*	Somewhat crumbly but will hold together from pressure.	Somewhat pliable, will ball under pressure.
	0 to 25	Dry, loose, single-grained, flows through fingers.	Powdery, dry, sometimes slightly crusted but easily breaks down into powdery condition.	Hard, baked, cracked; sometimes has loose crumbs on surface.

* Ball is formed by squeezing a handful of soil firmly.